Listing of the Claims

1- (Currently Amended) A method for determining a velocity of ultrasound propagation in a drilling fluid in a downhole environment, comprising:

- disposing a first ultrasound transducer (37) ~~adjacent~~ proximate to a second ultrasound transducer (39) such that ~~the~~ a front face (37f) of the first transducer (37) is offset from ~~the~~ a front face (39f) of the second ultrasound transducer (39) by a predetermined radial offset distance (ΔDf);
- emitting an ultrasound pulse into the drilling fluid in a borehole using the first ultrasound transducer(37);
- detecting the ultrasound pulse after the ultrasound pulse has travelled through the drilling fluid a distance (d);
- determining a travel time (t) for the ultrasound pulse to travel the distance (d); and
- determining the velocity of ultrasound propagation from the distance (d) and the travel time (t).

2- (Original) The method according to claim 1, wherein the detecting the ultrasound pulse is performed with the first ultrasound transducer (37).

3- (Original) The method according to claim 1, wherein the detecting the ultrasound pulse is performed with the second ultrasound transducer (39).

4- (Original) The method according to claim 1, wherein the detecting the ultrasound pulse is performed with both the first and second ultrasound transducer.

5- (Original) The method according to claim 4, further comprising determining a borehole diameter (D_{hh}) using the predetermined offset distance (ΔDf) and a difference in travel times ($T_2 - T_1$) for the ultrasound pulse to be detected by the first ultrasound transducer (37) and the second ultrasound transducer (39).

6- (Original) The method according to claim 1, wherein the detecting the ultrasound pulse is performed by the first ultrasound transducer (37), and wherein the method further comprises:

emitting a second ultrasound pulse into the drilling fluid in the borehole using the second ultrasound transducer (39); and

detecting the second ultrasound pulse after the second ultrasound pulse has traveled through the drilling fluid a distance ($d + 2\Delta D_f$) using the second ultrasound transducer (39).

7- (Original) The method according to claim 6, wherein the ultrasound pulse and the second ultrasound pulse are emitted simultaneously.

8- (Previously presented) The method according to claim 1, wherein the drilling fluid is located in an annulus between a tool and a borehole wall.

9- (Currently amended) An apparatus for determining a velocity of ultrasound propagation in a drilling fluid in a downhole environment, comprising:

a first ultrasound transducer (37) disposed on a tool;

a second ultrasound transducer (39) ~~adjacent~~ proximate to said first ultrasound transducer, the first and second ultrasound transducers being located on the tool such that ~~the~~ a front face (37f) of the first transducer (37) is offset from ~~the~~ a front face (39f) of the second ultrasound transducer (39) by a predetermined radial offset distance (ΔDf) ; and

a circuitry (82) for controlling a timing of an ultrasound pulse transmitted by the first ultrasound transducer (37) and for measuring a time lapse between ultrasound transmission and detection after the ultrasound pulse has traveled a distance (d).

10- (Original) The apparatus according to claim 9, wherein the first ultrasound transducer (37) and the second ultrasound transducer (39) are disposed on an outside surface of the tool.